

What is claimed is:

1. An exhaust purifying apparatus of an internal combustion engine, comprising:

an exhaust throttle valve provided in an exhaust
5 passage of the internal combustion engine, so as to be able to be closed to close the exhaust passage;

a relief passage provided communicating with the exhaust passage and bypassing said exhaust throttle valve;

a relief valve provided in said relief passage so as
10 to be able to be closed to close said relief passage, and arranged to be opened to open said relief passage when receiving an increased pressure in the exhaust passage that is closed with closure of said exhaust throttle valve;

fuel cut determining means for determining whether
15 the internal combustion engine is during fuel cut-off; and

a relief-valve forcibly operating means for closing said exhaust throttle valve to open said relief valve when it is determined by said fuel cut determining means that the internal combustion engine is during fuel cut-off.

20 2. The exhaust purifying apparatus according to claim 1, wherein said exhaust throttle valve is rotatably driven between a fully opened position and a fully closed position, to thereby open and close the exhaust passage.

25 3. The exhaust purifying apparatus according to claim 1, wherein said relief valve maintains the pressure in the exhaust passage to be equal to or less than a predetermined pressure.

30 4. The exhaust purifying apparatus according to claim 1, wherein said fuel cut determining means determines whether the internal combustion engine is during fuel cut-off in deceleration, and

said relief-valve forcibly operating means closes said exhaust throttle valve when said fuel cut determining

means determines that the internal combustion engine is during fuel cut-of in deceleration.

5. The exhaust purifying apparatus according to claim 1, further comprising:

5 an exhaust purifying catalyst provided in the exhaust passage;

wherein said relief-valve forcibly operating means closes said exhaust throttle valve when an earlier activation of said exhaust purifying catalyst is performed in a state where the internal combustion engine is cold, in addition to when said fuel cut determining means determines that the internal combustion engine is during fuel cut-off.

6. The exhaust purifying apparatus according to claim 1, further comprising:

15 an exhaust purifying catalyst provided in the exhaust passage;

wherein said relief-valve forcibly operating means closes said exhaust throttle valve when a purging of absorbed substances absorbed by said exhaust purifying catalyst is performed, in addition to when said fuel cut determining means determines that the internal combustion engine is during fuel cut-off.

7. The exhaust purifying apparatus according to claim 1, further comprising:

25 a filter provided in the exhaust passage;

wherein said relief-valve forcibly operating means closes said exhaust throttle valve when a burning of particulates collected by said filter is performed to remove the particulates, in addition to when said fuel cut determining means determines that the internal combustion engine is during fuel cut-off.

8. The exhaust purifying apparatus according to claim 1, further comprising:

an adhesion-amount-related value estimating means for estimating an adhesion-amount-related value that correlates with an adhesion amount of contaminants to said relief valve;

5 wherein said relief-valve forcibly operating means closes said exhaust throttle valve when the adhesion-amount-related value that is estimated by said adhesion-amount-related value estimating means exceeds a predetermined value and at the same time when said fuel cut
10 determining means determines that the internal combustion engine is during fuel cut-off.

9. The exhaust purifying apparatus according to claim 8, wherein said adhesion-amount-related value estimating means estimates the adhesion-amount-related
15 value in accordance with a time elapsing from when the adhesion-amount-related value was reset, and a time period during which said exhaust throttle valve is closed since the adhesion-amount-related value was reset.

10. The exhaust purifying apparatus according to
20 claim 1, further comprising:

an intake air amount increasing means for increasing an intake air amount of the internal combustion engine;

 wherein said relief-valve forcibly operating means closes said exhaust throttle valve, and operates said
25 intake air amount increasing means to increase the intake air amount of the internal combustion engine in accordance with increase in exhaust resistance as a result of the closure of said exhaust throttle valve.

11. An exhaust purifying apparatus of an internal
30 combustion engine, comprising:

an exhaust throttle valve provided in an exhaust passage of the internal combustion engine, so as to be able to be closed to close the exhaust passage;

a relief passage provided communicating with the exhaust passage and bypassing said exhaust throttle valve;

a relief valve provided in said relief passage so as to be able to be closed to close said relief passage, and
5 arranged to be open to open said relief passage when receiving an increased pressure in the exhaust passage that is closed with closure of said exhaust throttle valve;

deceleration determining means for determining whether the internal combustion engine is during
10 deceleration; and

a relief-valve forcibly operating means for closing said exhaust throttle valve to open said relief valve when it is determined by said deceleration determining means that the internal combustion engine is during deceleration.

15 12. A failure prevention method for an exhaust purifying apparatus of an internal combustion engine, comprising the steps of:

(a) determining whether or not the internal combustion engine is during fuel cut-off or deceleration;
20 and

(b) closing an exhaust throttle valve so as to cause a relief valve to open when it is determined at said step (a) that the internal combustion engine is during fuel cut-off or deceleration, the exhaust throttle valve being
25 provided in an exhaust passage of the internal combustion engine for closing the exhaust passage to increase a pressure in the exhaust passage, and the relief valve being provided to be able to close a relief passage that is provided communicating with the exhaust passage and
30 bypassing the exhaust throttle valve.